

BRITISH COLUMBIA DEPARTMENT OF MINES

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BULLETIN No. 14

ANALYSES OF
BRITISH COLUMBIA
COALS

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ANALYSES OF BRITISH COLUMBIA COALS.

The following tables give the analyses of British Columbia coals and details of their adaptability for use in the pulverized form, their products under low-temperature carbonization treatment, and their indicated value by means of hydrogenation or liquification; the latter system converting a high percentage of the total weight of the treated coal into gasoline and other derivatives of coal.

All the more recent samples were taken by the Inspectors of Mines and the analyses were made by the Chief Analyst and Assayer.

In some instances the samples were taken by Provincial officials and the analyses and tests were carried out by the authorities of the Dominion Fuel Research Laboratories at Ottawa. The low-temperature tests on British Columbia coals were made on bulk samples shipped to Barnsley, England, for this purpose, and the liquification tests were made in the Dominion Fuel Research Laboratories, Ottawa.

Many of the analyses are from samples taken in mines now abandoned but, as coal-seams generally retain the same characteristics over wide areas, such analyses will be of interest and value in the event of new mines being opened adjacent to those now abandoned.

On Vancouver Island the mines at present operated are Nos. 5 and 8 mines, Comox Colliery, and No. 10 and Wellington mines, near Nanaimo. In addition to these are a number of small operations, largely of a temporary nature, with a small aggregate production.

In the Interior area, the Middlesboro Collieries at Merritt, the Princeton Tulameen Company and the Granby Consolidated Mining and Smelting Company, Limited, at Princeton, are the main producers. The latter Company up to the present time has used practically the whole mine production for their central steam-electric power plant at Princeton.

There are a number of developed and semi-developed mines in this area that have not been operated for several years.

In the East Kootenay area the mines at present in operation are the No. 1 East mine at Coal Creek, near Fernie, and No. 1 and No. 3 mines at Michel, all of which are operated by the Crow's Nest Pass Coal Company, Limited. At both collieries there are developed mines that have not been in operation for a number of years.

In the Northern area near Telkwa, the Bulkley Valley Colliery and the Aveling Coal Company produce a small tonnage of high-grade coal which is sold along the Prince Rupert line of the Canadian National Railways.

In the Peace River District there are several small mines in seams of high-grade coal, but distance from markets has limited them to intermittent operations.

On Vancouver Island present indications are that the Comox area will be the chief centre of coal production and that while the Nanaimo area will no doubt produce coal for many years it will not regain its pre-eminence as a coal-producing area.

The Merritt-Princeton area is capable of producing a large tonnage of coal if markets were available or if coal could be utilized by means of a modern low-temperature or liquification plant.

The East Kootenay coalfield has by far the greatest tonnage of coal, both developed and probable, in the established coal-mining areas of the Province. This coal is eminently suited for all purposes of domestic, industrial, railroad, coking, and by-product utilization.

AUTHORITY OF ANALYSIS.

Ref. Letter.	Authority of Analysis.	Ref. Letter.	Authority of Analysis.
A	Minister of Mines Report, 1902, p. 262; sampled by Inspector.	H	Professor Minor Roberts, Washington University; private letter.
B	Geol. Surv., Canada, Mem. 53, p. 74 (1914).	I	Paper by Castleman, Can. Mining Inst.; analysis by Hersey, of Montreal.
C	Chief Engineer, Crow's Nest Pass Coal Company.	J	Analysis by Bryant & Co., Vancouver.
D	E. J. Roberts, General Manager, Corbin Coal and Coke Company.	K	B.C. Minister of Mines Report, 1901, p. 1176.
E	B.C. Bureau of Mines.	L	Geological Survey Summary, 1907, W. W. Leach.
F	Report by Dr. A. W. G. Wilson, McGill University, to C.P.R. Syndicate, in 1905.	M	B.C. Minister of Mines Report, 1905, pp. 119 and 121.
G	Geol. Surv., Canada, Ann. Rept., 1876-77; 1887-88; 1902-03; 1904.	N	Unpublished Analyses, B.C. Bureau of Mines.
		O	B.C. Minister of Mines Report, 1904.
		P	Analysis by J. O'Sullivan, Vancouver.

$$\text{Split Volatile Ratio} = \frac{\text{Fixed Carbon} + \frac{1}{2} \text{ Vol. Combustible.}}{\text{Moisture} + \frac{1}{2} \text{ Vol. Combustible.}}$$

DOWLING'S SCALE OF SPLIT VOLATILE RATIO.

Anthracite.....	15 up.	Bituminous.....	3.5 to 6.
Semi-anthracite.....	13 to 15.	Low-carbon bituminous.....	3 to 3.5.
Anthracitic coal.....	10 to 13.	Lignitic coal.....	2.5 to 3.
High-carbon bituminous.....	6 to 10.	Lignite.....	1 to 2.5.

CLASSIFICATION OF COAL.

The classification given in the tables of analyses in this bulletin are based on Dowling's Split Volatile Ratio method. This method has been superseded and the A.S.T.M. method is now used commonly in North America. The A.S.T.M. system of classification, indicated in the following table, uses the fixed carbon and the calorific value, recalculated on the mineral-matter-free (ash-free) basis. The higher-rank coals are classified by the fixed carbon content on the dry basis and lower-rank coals by the calorific value on the moist basis. Agglomerating—that is, weakly caking properties—and weathering properties are used in differentiating between some of the lower-rank groups.

CLASSIFICATION OF COALS BY RANK.

(A.S.T.M. Designation: D.388—38)—1937.

Class.	Group.	Limits of Fixed Carbon or B.T.U., Mineral-matter-free Basis.	Requisite Physical Properties.
I. Anthracite.....	1. Meta-anthracite..... 2. Anthracite..... 3. Semi-anthracite.....	Dry F.C., 98 per cent. or more. Dry F.C., 92 per cent. or more and less than 98 per cent. Dry F.C., 86 per cent. or more and less than 92 per cent.	Non-agglomerating ¹ .
II. Bituminous ²	1. Low volatile bituminous coal 2. Medium volatile bituminous coal 3. High volatile A bituminous coal 4. High volatile B bituminous coal 5. High volatile C bituminous coal	Dry F.C., 78 per cent. or more and less than 86 per cent. Dry F.C., 69 per cent. or more and less than 78 per cent. Dry F.C., less than 69 per cent. and moist ² B.T.U. 14,000 ⁴ or more. Moist ² B.T.U. 13,000 or more and less than 14,000. Moist B.T.U. 11,000 or more and less than 13,000 ⁴	Either agglomerating or non-weathering ⁵ .
III. Sub-bituminous.....	1. Sub-bituminous A coal 2. Sub-bituminous B coal 3. Sub-bituminous C coal	Moist B.T.U. 11,000 or more and less than 13,000 ⁴ Moist B.T.U. 9,500 or more and less than 11,000 ⁴ Moist B.T.U. 8,500 or more and less than 9,500 ⁴	Both weathering and non-agglomerating ⁵ .
IV. Lignite.....	1. Lignite..... 2. Brown coal.....	Moist B.T.U. less than 8,500..... Moist B.T.U. less than 8,500.....	Consolidated. Unconsolidated.

¹ If agglomerating, classify in low-volatile group of the bituminous class.

² Moist B.T.U. refers to coal containing its natural bed moisture but not including visible water on the surface of the coal.

³ It is recognized that there may be non-caking varieties in each group of the bituminous class.

⁴ Coals having 69 per cent. or more fixed carbon on the dry, mineral-matter-free basis shall be classified according to fixed carbon, regardless of B.T.U.

⁵ There are three varieties of coal in the high-volatile C bituminous coal group, namely: Variety 1, agglomerating and non-weathering; Variety 2, agglomerating and weathering; Variety 3, non-agglomerating and non-weathering.

TABLE I.—ANALYSES OF BRITISH COLUMBIA COALS, SAMPLES TAKEN PRIOR TO 1910.

(Classification according to Dowling's "Split Volatile Ratio.")

Designation No.	Locality.	Seam.	Authority or Reference.	PROX. ANALY. BY FAST COKING.				Sulphur.	Coking Quality.	British Thermal Units.	EXPANDED ANALYSES CALC. ON CLEAR COAL.			Split Vol. Ratio.	Classification by Split Vol. Ratio.	Remarks.
				Moist.	V.C.M.	F.C.	Ash.				Moist.	V.C.M.	F.C.			
1	Crow's Nest Pass Coalfield. No. 1 mine, Morrissey (Carbonado)	18 ft. thick	A	0.90	22.19	70.99	5.60	0.82		14,346	0.97	23.60	75.43	6.80	High carbon bit.	Highest seam worked, dip 21° N.
2	No. 4 mine, Morrissey (Carbonado)	18 ft.	"	0.82	11.73	71.50	15.75	0.20		12,858	0.98	13.96	85.06	11.50	Anthracitic coal.	
3	No. 1 mine, Coal Creek	8 ft.	"	0.84	23.59	67.46	7.85	0.32		14,036	0.91	25.69	73.40	6.30	High carbon bit.	
4	" 1 " " "	9 ft.	"	0.92	18.86	64.42	16.65	0.16		13,757	1.10	22.40	76.50	7.10	" " "	
5	" 2 " " "	6 ft.	"	0.84	22.38	73.17	3.15	0.46		14,935	0.88	23.21	75.91	7.00	" " "	Dip 15° to E.
6	" 3 " " "	"	"	0.92	20.63	72.05	5.00	0.40		14,284	0.98	22.04	77.98	7.30	High carbon bit.	
7	" 4 " " "	22 ft.	"	0.96	13.46	61.92	23.80	0.10		12,114	1.25	17.63	81.11	8.90	" " "	
8	" 3 " Michel	15 to 30 ft. thick	"	1.00	20.57	72.00	6.15	0.28		14,656	1.07	21.99	76.94	7.30	" " "	Highest seam worked.
9	" 4 " " 30 ft. below 3.	10 to 30 ft. thick	"	1.00	18.98	70.13	9.50	0.44	Good	13,850	1.10	21.00	77.90	7.60	" " "	
10	Marten Creek, Jubilee seam	30 ft. thick	B	1.89	30.41	63.33	4.37			14,447	1.98	31.80	66.22	4.60	Bituminous.	
11	" " Peter "	"	"	1.79	32.04	61.55	3.62			14,400	1.86	34.28	63.86	4.30	"	
12	" " Cannel "	"	"	2.10	57.71	30.33	9.96				2.34	64.00	33.65	1.90	Cannel coal.	
13	No. 1 mine, Coal Creek	9 ft. to 12 ft. thick	C	1.19	26.54	65.63	6.64				1.27	28.48	70.30	5.40	Bituminous	Av. of 11 samples from N. levels off slope.
14	" 1 " " "	" " "	"	1.37	26.95	61.66	11.02				1.54	29.17	69.29	5.20	"	Av. of 9 samples from N. levels off incline.
15	" 1 " " "	" " "	"	1.27	27.22	65.02	8.39				1.50	29.71	68.79	5.10	"	Av. of 11 samples from S. levels off incline.
16	" 2 " " "	6 ft. thick	"	1.00	21.85	73.30	3.85				1.05	22.72	76.23	7.00	High carbon bit.	No. 3 West entry deeps.
17	" 2 " " "	5 ft. and 6 ft.	"	1.00	24.30	69.70	5.00				1.05	25.58	73.37	6.30	" " "	Av. 13 samples, No. 2 and 3 W. ent.
18	" 5 " " "	5 ft. and 10 ft.	"	0.96	24.09	68.19	11.76				1.09	27.30	71.61	5.80	Bituminous	Av. 15 samples.
19	" 5 " " "	5 ft.	"	0.98	21.94	64.40	12.68				1.12	25.12	73.76	6.30	High carbon bit.	Av. 31 samples. Av. of mine.
20	" 9 " " "	5 ft. to 5½ ft.	"	1.25	24.60	69.45	4.70				1.31	25.81	72.88	6.00	" " "	Av. 18 samples, Long-wall face.
21	" 9 " " "	4 ft. to 6 ft.	"	0.75	25.65	69.29	4.21				0.78	26.78	72.44	6.00	" " "	Av. 11 samples from main levels.
22	" 5 " Michel	5 ft. 6 in.	"	1.20	19.55	87.75	11.50				1.35	22.10	76.58	7.10	" " "	Room 2 off 1 E. level, 1 E. incline.
23	" 5 " " "	5 ft. 6 in.	"	1.10	20.50	71.10	7.30				1.20	22.10	76.70	7.20	" " "	Room 2 off 2 W. level, 1 W. incline.

TABLE I.—ANALYSES OF BRITISH COLUMBIA COALS, SAMPLES TAKEN PRIOR TO 1910—Continued.

Designation No.	Locality.	Seam.	Authority or Reference.	PROX. ANALY. BY FAST COKING.				Sulphur.	Coking Quality.	British Thermal Units.	EXPANDED ANALYSIS CALC. ON CLEAR COAL.			Split Vol. Ratio.	Classification by Split Vol. Ratio.	Remarks.
				Moist.	V.C.M.	F.C.	Ash.				Moist.	V.C.M.	F.C.			
CROW'S NEST PASS COALFIELD																
—Continued.																
24	No. 3 Mine, Michel	5 ft. 6 in. to 7 ft.	C	1.01	20.95	69.00	9.04				1.12	23.04	75.84	6.90	High carbon bit.	Av. 8 samples, Rise workings.
25	" " "	12 ft.	"	1.85	23.15	69.30	5.70				1.96	24.55	73.49	6.00	" " "	R. 6, E. level, No. 3 incline.
26	" " "	10 ft.	"	1.85	22.95	70.60	4.60				1.94	24.06	74.00	6.10	" " "	R. 10, E. level, No. 3 incline.
27	" " "	12 ft.	"	1.00	22.85	69.55	6.60				1.08	24.45	74.46	6.50	" " "	R. 6, E. level, No. 3 incline.
28	" " "	12 ft.	"	1.50	22.10	66.50	9.90				1.67	24.52	73.81	6.10	" " "	R. 6, W. level, No. 3 incline.
29	" " "	10 ft.	"	1.10	25.70	65.85	7.35				1.10	27.73	71.08	5.60	Bituminous	R. 34, No. 2 E. level.
30	" " "	20 ft.	"	0.80	23.50	66.90	8.80				0.87	25.77	73.36	6.20	High carbon bit.	R. 52, No. 2 E. level.
31	" " "	30 ft.	"	0.92	23.50	67.46	8.12				1.00	25.57	73.43	6.20	" " "	R. 40, No. 2 E. level.
32	" " "	"	"	1.62	23.67	67.79	6.92				1.74	25.43	72.83	6.90	Bituminous	Av. 23 samples, 3 E. and 3 W. main incline.
33	Corbin Coal & Coke Co., Corbin	Special 10-ft. band	D	1.50	12.50	79.00	6.00				1.60	14.36	84.04	10.40	Anthracitic coal.	
34	" " "	Average run of coal	"	2.00	22.00	66.00	10.00				2.22	24.45	73.33	5.90	Bituminous.	
UPPER ELK RIVER FIELD.																
35	Aldridge Creek, C.P.R. Synd., Lot No. 6825	No. 1, 14 ft.	E	1.10	23.30	69.60	6.60		Good		1.18	24.95	73.87	6.30	High carbon bit.	Sampled by Prov. Min., 1909.
36	Aldridge Creek, C.P.R. Synd., Lot No. 6825	No. 2, 14 ft.	"	1.00	23.90	65.90	9.20		"		1.10	26.32	72.58	6.00	" " "	" " " "
37	Aldridge Creek, C.P.R. Synd., Lot No. 6825	No. 3, 9 ft.	E	0.90	22.40	64.40	12.30		Good		1.02	25.55	73.43	6.20	" " "	" " " "
38	Aldridge Creek, C.P.R. Synd., Lot No. 6825	No. 5, 10 ft.	"	0.90	18.90	67.40	12.80		"		1.03	21.67	77.30	7.40	" " "	" " " "
39	Headquarters Camp, Elk River, Lot No. 6047		"	0.90	17.90	73.70	7.50		Fair		0.97	19.35	79.65	8.30	" " "	" " " "
40	Northern Coal Co., Elk River	Outcrop	"	8.60	20.50	54.70	16.20		Poor		10.26	24.40	65.28	3.40	Low carbon bit.	" " " "
41	Imp. C. & C. Co., Fording River	A	"	1.40	19.10	71.40	8.10		Good		1.52	20.78	77.70	7.40	High carbon bit.	" " " "
42	" " "	B	"	0.90	21.00	69.50	8.00		"		0.97	23.48	75.55	6.90	" " "	" " " "
43	" " "	C	"	2.80	22.80	69.40	5.00		Poor		2.95	24.00	73.05	4.00	Bituminous	" " " "
44	" " "	E	"	4.40	22.20	62.50	10.90		Good		4.94	24.91	70.16	4.70	" " "	" " " "
45	" " "	F	"	1.40	23.10	64.20	11.30		"		1.57	26.05	72.38	5.80	" " "	" " " "
46	" " "	G	"	1.20	24.70	62.80	11.20		"		1.46	27.32	70.72	5.50	" " "	" " " "
47	" " "	I	"	0.70	14.70	55.40	29.20		Fair		0.98	20.77	78.25	7.80	High carbon bit.	" " " "

48	Elk Riv., C.P.R. Syn., Lot 6980	Surface outcrop	F	8.20	30.30	58.50	8.00	Non	8.47	31.23	60.30	3.10	Low carbon bit.	From Prospect workings.
49	"	"	"	8.00	26.90	61.80	4.30	"	8.36	27.06	64.53	3.50	Bituminous	"
50	"	"	"	5.40	29.90	53.70	6.00	"	5.74	31.81	62.44	3.60	"	"
51	"	"	"	5.40	29.30	62.40	2.90	"	5.56	30.17	64.27	3.80	"	"
52	"	"	"	11.00	26.50	58.00	4.50	"	11.51	27.74	60.74	2.90	Lignite coal?	Analysis doubtful.
53	"	Deep cut	"	1.00	24.20	67.40	7.40	Coking	1.08	26.13	72.79	6.00	High carbon bit.	"
54	"	"	"	0.80	19.70	59.20	20.30	"	1.03	24.71	74.26	6.40	"	"
55	"	"	"	0.70	20.50	66.20	22.60	"	0.91	26.48	72.61	6.00	"	"
56	"	Shallow cut	"	2.00	18.80	65.60	9.60	Non	2.21	20.79	77.00	6.90	"	"
57	"	"	"	1.50	19.50	73.40	5.60	Poor	1.50	20.65	77.76	7.40	"	"
58	"	"	"	0.70	22.30	69.10	1.90	"	0.71	23.86	70.43	5.60	Bituminous.	"
59	"	"	"	0.80	26.70	63.30	9.20	"	0.88	29.41	69.71	5.40	"	"
60	"	"	"	3.40	22.10	62.60	14.90	Coking	4.00	34.19	61.81	3.70	"	"
61	"	"	"	4.70	29.60	60.40	5.30	Slightly	4.97	31.25	63.78	3.80	"	"
62	"	"	"	3.80	15.20	77.90	3.10	"	3.92	15.69	80.39	7.40	High carbon bit.	"
63	"	"	"	19.60	19.00	50.10	11.30	Non	22.09	21.43	56.48	2.00	Lignite.	"
64	"	Surface	"	8.20	33.90	49.80	18.10	"	10.02	29.18	60.80	3.00	Low carbon bit.	"
65	"	Shallow cut	"	6.00	26.90	63.30	3.30	"	6.23	27.96	66.81	3.30	Bituminous.	"
66	"	"	"	0.60	32.10	64.50	2.50	Coking	0.61	32.92	66.47	4.80	"	"
67	"	"	"	0.70	24.60	55.20	19.50	"	0.87	30.55	63.58	6.20	"	"
68	"	"	"	0.80	26.80	56.10	7.80	"	0.86	28.53	70.61	5.60	"	"
69	"	"	"	6.20	18.20	63.90	11.70	Non	7.02	20.62	72.36	4.70	"	"
70	"	"	"	1.20	20.00	55.70	23.10	Coking	1.56	26.00	72.44	5.80	"	"
71	"	"	"	1.50	19.90	60.40	18.30	"	1.83	24.24	73.93	6.10	High carbon bit.	"
72	"	Surface	"	6.50	21.70	61.00	10.80	Non	7.29	24.33	63.33	4.10	Bituminous.	"
73	"	"	"	6.80	23.00	57.10	13.10	"	7.88	26.46	65.71	3.70	"	"
74	"	"	"	7.30	33.30	64.30	5.10	"	7.69	34.56	67.75	4.00	"	"
75	"	"	"	3.00	17.30	61.70	18.00	Slight	3.66	21.10	75.24	6.00	High carbon bit.	"
76	"	"	"	10.50	19.80	67.50	12.20	Non	11.95	22.56	65.49	3.30	Low carbon bit.	"
77	"	"	"	18.40	27.40	51.90	7.30	"	14.45	29.56	55.99	2.40	Lignite.	"
78	"	"	"	20.30	15.10	44.10	20.50	"	25.53	19.00	55.47	1.80	"	"
79	"	"	"	12.80	30.90	36.50	19.80	"	15.96	38.52	45.52	1.80	"	"
COAST DISTRICT.														
80	Comox, Union Colliery	Upper seam	G	1.34	30.01	65.82	2.83	"	1.39	30.88	67.73	4.90	Bituminous.	"
81	"	Lower seam	"	1.70	32.36	63.08	2.98	"	1.75	33.31	64.94	4.40	"	"
82	" Baynes Sd. mine	Richardson seam	"	1.18	34.15	48.51	16.18	"	1.41	40.72	57.87	3.60	"	"
83	Vancouver Id., No. 5 pit, Comox	Upper seam	A	1.08	29.24	57.03	9.60	3.05	1.23	33.48	65.29	4.60	"	"
84	" Comox, Hamilton Lake	"	"	1.70	22.82	47.72	27.00	0.76	10.626	2.36	31.58	66.06	4.50	"
85	No. 4 slope	Comox or low. seam	"	0.38	27.84	61.82	8.70	1.20	18.861	0.95	30.36	68.66	5.20	"
86	No. 5 pit	"	"	1.32	27.62	63.64	6.70	0.72	14.191	1.42	29.84	68.74	5.10	"
87	No. 6 pit	"	"	1.26	27.33	63.49	6.80	1.12	14.191	1.36	29.65	68.90	5.10	"
88	No. 1 shaft, Esplan., Nanaimo	Up. se., dip 1 in 10 E.	"	1.88	33.87	54.67	9.40	0.78	12.072	2.10	37.04	60.86	3.80	"
89	"	Lo. seam, 1 in 10 E.	"	2.86	35.84	54.79	5.50	1.01	12.951	3.06	38.33	58.61	3.50	"
90	Harewood mine; dip 1 in 10 E.	"	"	1.66	32.84	52.17	11.85	0.56	12.238	1.80	38.64	59.66	3.70	"

TABLE I.—ANALYSES OF BRITISH COLUMBIA COALS, SAMPLES TAKEN PRIOR TO 1910—Continued.

Designation No.	Locality.	Seam.	Authority or Reference.	PROX. ANALY. BY FAST COKING.				Sulphur.	Coking Quality.	British Thermal Units.	EXPANDED ANALYSIS CALC. ON CLEAR COAL.			Split Vol. Ratio.	Classification by Split Vol. Ratio.	Remarks.
				Moist.	V.C.M.	F.C.	Ash.				Moist.	V.C.M.	F.C.			
COAST DISTRICT—Continued.																
91	No. 5 Southfield mine		A	2.08	35.78	56.26	5.60	0.28		12,261	2.21	38.02	59.77	3.70	Bituminous.	
92	Bottom vein, 15 to 20% S. 20° W.	Extension seam	"	1.28	35.26	56.83	7.80	0.83		13,199	1.33	38.17	60.45	3.80	"	
93	Top vein, 15 to 20% S. 20° W.	" "	"	1.24	36.49	53.72	8.20	0.36		13,261	1.35	39.90	59.75	3.70	"	
94	Bottom seam, Tunnel vein (Report, 1902)	S. 12° W. dip 10%	"	1.52	35.27	57.04	5.85	0.32		13,416	1.62	37.53	60.80	3.90	"	
95	Top seam, Tunnel vein (Report, 1902)	" " "	"	1.44	31.40	46.18	20.65	0.33		11,401	1.82	39.74	58.44	3.60	"	
96	Nanaimo, Wellington mine		G	2.75	38.03	52.64	6.58			12,567	2.95	40.70	56.34	3.30	Low carbon bit.	
97	" New Vanc. C. Co.	Commercial coal	"	2.06	34.07	56.94	6.67	0.25			2.21	36.61	61.18	3.80	Bituminous.	
98	" No. 5 Southfield		A	2.08	35.78	56.26	5.60	0.28		13,261	2.21	38.02	59.77	3.70	"	
99	" Wellington mine	Commercial samp.	G	8.57	25.30	56.40	9.52	0.21			9.50	28.02	62.48	3.20	Low carbon bit.	
100	Nicola, Middlesboro Colliery	Coal Gully	"	3.04	37.18	52.08	7.73		Good		3.29	40.30	56.41	3.20	" " "	
101	" Lot 1267	Quitchena Creek	"	6.95	37.21	47.95	7.89		"		7.54	40.40	52.06	2.60	Lignitic coal.	
102	" Coldwater		"	3.17	35.73	55.25	5.55		"		3.36	37.96	58.68	3.40	Low carbon bit.	
103	" Coldwater	6 ft. seam	"	2.13	27.99	59.66	10.22		"		2.37	31.18	66.46	4.50	Bituminous.	
104	" Coal Gully		"	3.35	26.55	59.30	10.80		"		3.76	29.76	66.48	4.30	"	
105	" Coal Hill Synd.	Av. of 3 seams	H	5.58	37.81	50.77	5.84				5.92	40.16	53.92	2.80	Lignitic coal	Av. of 5 analyses.
106	" Diamond Vale C. & I.	Lump	"	2.66	37.84	55.14	4.36				2.78	39.57	57.65	3.40	Low carbon bit.	
107	Nicola Val. C. & C. Co., Nicola	No. 1	"	4.69	36.89	51.06	7.96				5.06	39.82	55.12	3.00	" " "	
108	" " "	No. 5	"	3.44	38.86	49.24	8.46				3.76	42.45	53.79	3.00	" " "	
109	" Middlesboro Colliery	"	I	2.67	37.10	52.27	7.95	0.77			2.90	40.30	56.80	3.34	" " "	
110	Vermilion Forks M.C., Princeton Colliery	By B. of M.	E	16.40	31.70	45.10	6.80				17.60	34.90	49.40	1.80	Lignite.	
111	Vermilion Forks M.C., Princeton Colliery		J	10.45	36.77	45.60	6.42	0.76			11.25	39.62	49.13	2.21	Lignitic coal.	
112	Vermilion Forks M.C., Princeton Colliery	Av. of seam by P.M.	K	11.97	30.49	49.21	8.33				13.06	33.26	53.68	2.40	" "	
NORTHERN INTERIOR.																
113	Telkwa River	5 ft. 6 in.	L	1.36	10.37	80.82	6.95				1.46	11.63	86.36	12.70	Anthracitic coal.	
114	" "	7 ft. 3 in.	"	0.80	11.10	78.90	9.20				0.88	12.22	86.90	13.30	Semi-anthracite.	
115	" "	4 ft.	"	0.60	10.80	82.70	5.90				0.64	11.43	87.59	14.60	"	
116	" Goat Cr., Cassiar C.C.	14 ft.	M	6.60	29.00	56.90	7.50				7.13	31.26	61.61	3.40	Low carbon bit.	

117	" " Transcontinental Dev. Synd.	28 in.	"	0.80	8.20	81.60	9.40			0.88	9.06	90.06	17.50	Anthracite.
118	Morice River, Bulkley Valley		N	2.70	22.90	68.80	5.60	Non		2.86	24.26	72.58	5.60	Bituminous.
119	Fraser River, near Quesnel		"	14.60	37.30	43.40	4.70	"		15.32	39.14	45.54	1.80	Lignite.
120	" " 30 m. below Ques.		"	27.90	28.60	34.50	9.00	"		30.65	31.43	27.92	1.10	"
121	Queen Char. Ids., Camp Wilson	No. 1 surface	O	1.38	17.22	61.96	19.49			1.66	21.38	76.96	7.10	High carbon bit.
122	" " "	No. 3 surface	"	2.01	9.13	86.06	2.80			2.07	9.39	88.64	13.70	Semi-anthracite.
123	Tumbo Island		P	1.50	41.00	50.50	6.00	1.00		1.60	44.00	64.30	3.20	Low carbon bit.

TABLE II.—ANALYSES OF BRITISH COLUMBIA COALS, PEACE RIVER AREA.
(From Department of Mines and Resources, Canada, Publication No. 779, "Analyses of Coals and other Solid Fuels, 1934 to 1936.")

	Mined by Neil Gething, Hudson Hope.	From the Vicinity of Pine Pass.	From Carbon Creek, entering Peace River a few Miles West of Rocky Mountain Canyon.	From Lot 1033, Gething Creek, Rocky Mountain Portage.	From Main Gething Creek, Peace River Canyon.	
Sample No.	2479	1654	2525	1664	2223	2222
Moisture condition	R D	R D	R D	R D	R D	R D
Proximate Analysis—						
Moisture per cent.	2.7	0.9	1.9	1.9	1.1	1.1
Ash	5.0 5.2	9.0 9.1	5.1 5.2	1.8 1.8	5.5 5.5	3.3 3.4
Volatile matter	22.0 22.6	16.0 16.1	23.3 23.3	18.2 18.6	24.0 24.3	23.8 24.0
Fixed carbon	70.3 72.2	74.1 74.8	69.7 71.5	78.1 79.6	69.4 70.2	71.8 72.6
Ultimate Analysis—						
Sulphur per cent.	0.8 0.8	0.6 0.6	0.7 0.7			
Calorific Value—						
Calories per gramme, gross	7,975 8,200	7,785 7,850	7,760 7,910			
B.T.U. per pound, gross	14,350 14,760	14,010 14,140	13,970 14,240			
Fuel ratio	3.20	4.65	3.00	4.25	2.90	3.00
Coking properties	Fair	Agglomerate	Weak agglomerate	Agglomerate	Very poor	Non-coking
Designation of coal	Blacksmith coal; stored in open 1 year prior to ship- ment from mine.					
Kind of sample	Commercial; from pile at Peace River, Alberta.	Prospect				
Location in deposit			5-foot seam	Falls seam	Top 8 inches.	Middle 11 inches.
Taken by	Mining Inspector, Northwest Terri- tories and Yukon Branch.	Private individuals			F. H. McLearn, Geological Survey.	
Date of sampling	August or September, 1923.	Received January 12, 1920.	October, 1923	Received April 14, 1920.	Season of 1922	

R=Received. D=Dried at 105° C.

TABLE II.—ANALYSES OF BRITISH COLUMBIA COALS, PEACE RIVER AREA—Continued.

	From Main Gething Creek.				From Gething Creek.				From Junction of Main and North Branches, Gething Creek.	From North Branch of Gething Creek.	From Johnson Creek.					
Sample No.	2221		2224		2227		2226		2225	2228	2198		2199		2201	
Moisture condition	R	D	R	D	R	D	R	D	R	D	R	D	R	D	R	D
Proximate Analysis—																
Moisture..... per cent.	0.9		1.6		0.8		0.9		1.0		0.6		0.9		1.2	
Ash..... "	2.3	2.4	8.4	8.5	2.7	2.7	2.7	2.7	3.5	3.5	8.5	8.5	4.1	4.1	7.4	7.5
Volatile matter..... "	25.9	26.1	26.0	26.4	18.9	19.1	19.3	19.5	25.2	25.5	24.5	24.8	19.0	19.1	20.6	20.8
Fixed carbon..... "	70.9	71.6	64.0	65.1	77.6	78.2	77.1	77.8	70.3	71.0	66.0	66.7	70.3	70.8	71.1	71.7
Ultimate Analysis—																
Sulphur..... per cent.			0.5	0.5	0.8	0.8	0.9	0.9			0.7	0.7			0.7	0.7
Calorific Value—																
Calories per gramme, gross.....			7,420	7,540	8,100	8,175	8,100	8,175			7,675	7,750			7,675	7,740
B.T.U. per pound, gross.....			13,360	13,570	14,580	14,720	14,580	14,720			13,820	13,950			13,820	13,950
Fuel ratio.....	2.75		2.45		4.10		4.00		2.80		2.70		4.00		3.45	
Coking properties.....	Very poor		Non-caking		Non-caking		Non-caking		Non-caking		Non-caking		Non-caking		Non-caking	
Kind of sample.....	Prospect.															
Location in deposit.....	Falls seam: bottom 15 inches.	Trojan seam.		Galloway seam: Upper 1 foot 6 inches.		Lower 2 feet 6 inches.		2-foot 5-inch seam.		Trojan seam	2-foot 10-inch seam.		4-foot 1-inch seam.		Trojan seam: middle 1-foot 7-inch and 2-foot 2-inch benches.	
Taken by.....	F. H. McLearn, Geological Survey															
Date of sampling.....	Season of 1922															

R=Received. D=Dried at 108° C.

TABLE II.—ANALYSES OF BRITISH COLUMBIA COALS, PEACE RIVER AREA—Continued.

	From Johnson Creek.		From Moosebar Creek.				From Mogul Creek.				FROM EARLE NARROWS.				From Contact Point.	
											South Side.		North Side.			
Sample No.	2202		2203		2204		2229		2230		2210		2211		2232	
Moisture condition	R	D	R	D	R	D	R	D	R	D	R	D	R	D	R	D
Proximate Analysis—																
Moisture.....per cent.	0.7	.....	1.0	.....	2.4	.....	2.7	.....	1.2	.....	1.4	.....	2.0	.....	0.7	.....
Ash....."	6.1	6.1	10.4	10.5	3.5	3.6	10.5	10.8	4.6	4.7	4.2	4.3	3.5	3.5	16.1	16.2
Volatile matter....."	28.6	28.8	17.8	18.0	21.1	21.6	24.3	25.0	22.0	23.2	22.7	23.0	21.7	22.2	24.8	25.0
Fixed carbon....."	64.6	65.1	70.8	71.5	73.0	74.8	62.5	64.2	71.3	72.1	71.7	72.7	72.8	74.3	58.4	58.8
Ultimate Analysis—																
Carbon.....per cent.	.....	.....	.....	.....	.....	.....	.....	.....	82.0	83.0	.....	.....	.....	.....	.....	.....
Hydrogen....."	.....	.....	.....	.....	.....	.....	.....	.....	4.4	4.3	.....	.....	.....	.....	.....	.....
Ash....."	.....	.....	.....	.....	.....	.....	.....	.....	4.6	4.7	.....	.....	.....	.....	.....	.....
Sulphur....."	.....	.....	.....	.....	.....	.....	.....	.....	0.9	0.9	0.9	0.9	.....	.....	.....	.....
Nitrogen....."	.....	.....	.....	.....	.....	.....	.....	.....	1.0	1.0	.....	.....	.....	.....	.....	.....
Oxygen....."	.....	.....	.....	.....	.....	.....	.....	.....	7.1	6.1	.....	.....	.....	.....	.....	.....
Calorific Value—																
Calories per gramme, gross	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	7,900	8,010	.....	.....	.....	.....
B.T.U. per pound, gross	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	14,230	14,420	.....	.....	.....	.....
Fuel ratio	2.25		4.00		3.45		2.55		3.10		3.15		3.35		2.35	
Carbon-hydrogen ratio	.....		.....		.....		.....		18.6		19.1		.....		.....	
Caking properties	Good		Non-caking		Non-caking		Non-caking		Non-caking		Non-caking		Non-caking		Agglomerate	
Kind of sample	Prospect															
Location in deposit	Trojan seam ; bottom 1 foot 3 inches ex- posed coal.		9½-foot seam, below 2nd falls.		Milligan seam		Little Mogul seam.		Mogul seam				Milligan seam		Trojan seam ; upper half.	
Taken by	F. H. McLearn, Geological Survey															
Date of sampling	Season of 1922															

R=Received. D=Dried at 108° C.

TABLE II.—ANALYSES OF BRITISH COLUMBIA COALS, PEACE RIVER AREA—Continued.

	From Contact Point.		From North Bank of Peace River, above No. 1 Mine.		From No. 1 Mine.															
Sample No.	2233		2205		2214		2213		2212		2217		2216		2215					
Moisture condition	R	D	R	D	R	D	R	D	R	D	R	D	R	D	R	D				
Proximate Analysis—																				
Moisture	per cent. 0.6		0.7		0.7		0.6		0.7		0.7		0.8		0.7					
Ash	11.2	11.2	3.1	3.1	5.3	5.3	2.9	2.9	6.5	6.5	6.1	6.1	3.6	2.7	2.4	2.5				
Volatile matter	26.8	27.0	19.3	19.4	19.6	19.7	19.5	19.6	22.5	22.7	18.7	18.8	19.2	19.3	22.9	23.0				
Fixed carbon	61.4	61.8	78.9	77.5	74.4	75.0	77.0	77.5	70.3	70.8	74.5	75.1	77.4	78.0	74.0	74.5				
Ultimate Analysis—																				
Sulphur	per cent.				0.7 0.7		0.7 0.7		0.8 0.8		0.6 0.6		0.7 0.7		0.7 0.7					
Calorific Value—																				
Calories per gramme, gross					8,015 8,070		8,300 8,350		8,025 8,080		7,970 8,030		8,315 8,380		8,390 8,450					
B.T.U. per pound, gross					14,430 14,530		14,940 15,030		14,450 14,550		14,350 14,460		14,960 15,090		15,110 15,220					
Fuel ratio	2.30		4.00		3.80		3.95		3.16		4.00		4.05		3.25					
Coking properties	Good		Non-caking		Non-caking		Agglomerate		Good		Agglomerate		Agglomerate		Good					
Kind of sample	Prospect				Mine															
Location in deposit	Trojan seam; lower half.		Index seam; 1-foot 10-inch and 11-inch benches.		Mine seam; 35 feet from portal Top 3 feet 2 inches.						Middle 1 foot 11 inches.		Bottom 8 inches		Mine seam; junction of east crosscut and main haulage. Top 3 feet Middle 1 foot 9 inches Bottom 9 inches.					
Taken by	F. H. McLearn, Geological Survey																			
Date of sampling	Season of 1922																			

R=Received. D=Dried at 105° C.

TABLE II.—ANALYSES OF BRITISH COLUMBIA COALS, PEACE RIVER AREA—Continued.

	Presumably from No. 1 Mine.								From No. 1 Mine.								From below No. 1 Mine.	
Sample No.	2209		2208		2207		2206		2220		2219		2218		2231			
Moisture condition	R	D	R	D	R	D	R	D	R	D	R	D	R	D	R	D		
Proximate Analysis—																		
Moisture..... per cent.	0.6		0.7		0.8		0.5		0.5		0.6		0.6		0.7			
Ash..... "	2.6	2.6	2.1	2.1	3.3	3.4	3.4	3.4	4.1	4.1	2.5	2.6	2.4	2.4	5.6	5.6		
Volatile matter..... "	18.9	19.0	24.6	24.8	20.4	20.5	23.7	23.8	20.1	20.3	19.9	20.0	24.8	24.9	18.8	19.0		
Fixed carbon..... "	77.9	78.4	72.6	73.1	75.5	76.1	72.4	72.8	75.2	75.6	77.0	77.4	72.2	72.7	74.9	75.4		
Ultimate Analysis—																		
Carbon..... per cent.									84.6	85.2								
Hydrogen..... "									4.1	4.1								
Ash..... "									4.1	4.1								
Sulphur..... "									0.7	0.7					0.8	0.8		
Nitrogen..... "									1.0	1.0								
Oxygen..... "									5.5	4.9								
Calorific Value—																		
Calories per gramme, gross.....															8,015	8,076		
B.T.U. per pound, gross.....															14,430	14,530		
Fuel ratio.....	4.10		2.96		3.70		3.95		3.75		3.85		2.90		3.95			
Carbon-hydrogen ratio.....									20.7	21.0								
Coking properties.....	Non-caking		Good		Very poor		Good		Agglomerate		Non-caking		Good		Agglomerate			
Kind of sample.....	Mine.....															Prospect.		
Location in deposit.....	Mine seam, at entrance to west crosscut.				Mine seam; 300 feet west of west crosscut.				Mine seam; west end of main haulage.....								Riverside seam.	
	Top 4 feet 6 inches.		Bottom 11 inches.		Top 5 feet.....		Bottom 9 inches.		Top 2 feet 8 inches.		Middle 1 foot 10 inches.		Bottom 9 inches.					
Taken by.....	F. H. McLearn, Geological Survey.....																	
Date of sampling.....	Season of 1922.....																	

R=Received. D=Dried at 108° C.

TABLE III.—ANALYSES OF BRITISH COLUMBIA COALS, 1926.

Sample No.	Date received.	Colliery.	Grade of Coal.	PROXIMATE ANALYSIS.							Coking Quality.
				Moisture.	Volatile Combustible Matter.	Fixed Carbon.	Ash.	Sulphur.	British Thermal Units.	Moisture Loss after 4 Days.	
	1926.	Canadian Collieries (D.), Ltd.—		%	%	%	%	%		%	
9301	Feb. 5	No. 5 South Wellington mine, Douglas seam	Washed pea	1.80	31.50	59.50	16.50	0.55	11,656	3.00	Good
9302	" 5	No. 5 South Wellington mine, Douglas seam	Washed nut	1.10	34.30	55.20	9.40	0.35	13,020	1.50	Good.
9303	" 5	No. 5 South Wellington mine, Douglas seam	Washery fines	1.40	34.50	53.60	10.50	0.55	13,020	4.50	Good.
9304	" 5	No. 5 South Wellington mine, Douglas seam	Lump	1.40	34.20	55.40	9.00	0.26	13,175	1.50	Good.
9305	" 5	Extension mine, Wellington seam	Washery fines	1.30	34.60	57.10	7.00	0.46	13,485	1.50	Good.
9306	" 5	Extension mine, Wellington seam	Washed pea	1.20	33.00	52.30	13.50	0.46	12,555	7.50	Good.
9307	" 5	Extension mine, Wellington seam	Washed nut	1.40	33.90	54.90	9.90	0.40	12,710	3.50	Good.
9308	" 5	Extension mine, Wellington seam	Lump	1.40	35.30	56.70	6.60	0.40	13,640	1.50	Good.
		East Wellington Coal Co.—									
9309	" 5	Wellington seam	Washery fines	2.00	34.90	54.40	8.70	0.40	12,710	1.50	Good.
9310	" 5	Wellington seam	Lump	2.00	34.80	54.70	8.50	0.50	12,865	1.00	Good.
9311	" 5	Wellington seam	Washed pea	1.90	34.50	52.90	10.70	0.50	12,555	0.50	Good.
9312	" 5	Wellington seam	Washed nut	2.00	35.10	52.70	10.20	0.50	12,710	0.50	Good.
		Canadian Collieries (D.), Ltd.—									
9313	" 5	No. 4 mine, Comox district	Crushed lump	0.30	24.90	63.40	11.40	0.38	12,555	4.00	Good.
9314	" 5	No. 5 mine	Crushed lump	0.40	30.60	55.50	12.50	0.54	12,555	1.00	Good.
9315	" 5	No. 5 mine	Comox crushed nut	0.40	25.70	64.30	9.60	0.92	12,710	1.00	Good.
9316	" 5	No. 5 mine	Comox pea	0.30	25.40	62.20	12.10	0.82	12,710	1.00	Good.
		Western Fuel Corporation, Ltd.—									
9317	" 5	Wakesiah mine, Wellington seam	Lump, domestic	0.80	33.60	53.60	12.00	1.22	11,625	1.00	Good.
9318	" 5	No. 1 mine, Newcastle seam	Lump, domestic	0.20	33.50	54.00	10.50	1.12	11,780	1.00	Good.
9319	" 5	No. 1 mine, Douglas seam	Lump, steam	1.30	34.40	56.30	8.00	1.04	12,555	1.00	Good.
9320	" 5	Reserve mine, Douglas seam	Lump, steam	0.80	32.40	53.80	8.00	3.62	12,246	3.00	Good.
9321	" 5	Reserve mine, Douglas seam	Washed slack	1.10	32.10	53.20	13.50	1.10	11,780	—	Poor.
9322	" 5	Reserve mine, Douglas seam	No. 1 nut	1.20	33.30	56.00	9.50	0.90	12,245	1.00	Good.
9323	" 5	Reserve mine, Douglas seam	No. 2 nut	1.10	31.60	54.50	13.40	3.92	11,825	1.00	Good.
9324	" 5	Reserve mine, Douglas seam	Pea	0.70	32.50	53.40	13.40	1.00	11,780	1.00	Good.
		Crow's Nest Pass Coal Co.—									
9325	" 5	Michel, No. 1 seam	—	0.90	21.50	72.50	5.10	0.40	13,640	3.00	Good.
9326	" 5	Michel, No. 1 seam	Slack	0.70	20.80	68.40	10.10	0.40	12,865	4.00	Good.
9327	" 5	Michel, No. 3 seam	Slack	0.60	19.30	70.40	9.70	0.70	12,710	3.00	Good.
9328	" 5	Michel, No. 3 seam	Coal	0.70	19.70	74.10	5.50	0.90	13,795	8.00	Good.
9329	" 5	Michel, No. 8 seam	Slack	0.60	22.00	73.00	4.40	0.60	13,940	—	Good.
9330	" 5	Michel, No. 8 seam	Coal	0.90	23.30	73.20	2.60	0.60	14,105	4.00	Good.

TABLE III.—ANALYSES OF BRITISH COLUMBIA COALS, 1926—Continued.

Sample No.	Date received.	Colliery.	Grade of Coal.	PROXIMATE ANALYSIS.							Coking Quality.
				Moisture.	Volatile Combustible Matter.	Fixed Carbon.	Ash.	Sulphur.	British Thermal Units.	Moisture Loss after 4 Days.	
	1926.	Granby Consolidated M.S. & P. Co.—		%	%	%	%	%		%	
9331	Feb. 5	Cassidy	Washed pea and slack	1.10	31.10	52.80	15.00	0.50	11,780	9.00	Good.
9332	" 5	Cassidy	Washed nut	1.10	33.10	55.80	9.00	0.50	12,505	3.00	Good.
9333	" 5	Cassidy	Lump	1.50	30.70	57.30	10.50	0.50	12,555	2.00	Good.
9334	" 5	Cassidy	Washed middlings	1.20	25.60	41.90	31.30	0.70	8,990	15.00	Poor.
		Tolkwa Collieries, Ltd.—									
9335	" 5	Goat Creek mine, No. 1 East level	Coking	0.80	28.20	62.60	8.40	1.80	13,020	3.50	Good.
9336	" 5	Goat Creek mine, No. 2 East level	Coking	0.50	28.90	61.60	8.80	1.80	13,020	3.00	Good.
		Crow's Nest Pass Coal Co.—									
9337	" 5	Coal Creek, from tippie	Market, screened	1.00	17.50	74.00	7.50	0.46	13,950	3.00	Good.
9338	" 5	Coal Creek, from tippie	Market, run of mine	0.80	19.20	69.60	10.40	0.60	13,640	2.00	Good.
9339	" 5	Coal Creek, from tippie	Market, slack	0.70	17.50	71.80	10.00	0.60	13,330	2.00	Good.
9340A	" 5	Coal Creek, No. 1 East, No. 1 seam; full height of seam, Main level		0.70	19.40	74.90	5.00	0.80	14,200	0.50	Good.
9341	" 5	No. 3 mine, No. 2 seam, No. 9 Right room, No. 3 slope; full height of seam, Main level		0.60	18.00	74.40	7.00	0.40	13,640	0.50	Good.
		Middlesboro Collieries, Ltd.—									
9342	" 5	No. 1 seam		3.30	30.00	56.10	10.60	0.70	12,090	2.00	Fair.
9343	" 5	No. 2 North seam (new prospect)		5.30	29.40	56.60	8.70	0.60	12,090	6.00	Poor.
9344	" 5	No. 4 East seam		3.40	32.80	58.10	4.50	0.60	12,710	3.00	Fair.
9345	" 5	No. 5 seam		4.90	31.30	56.80	7.00	0.70	12,555	4.00	Fair.
9346	" 5	No. 6 seam		6.60	29.40	54.80	9.20	0.75	11,780	3.00	Poor.
9347	" 5	No. 6 seam		4.10	30.10	51.50	14.30	0.40	11,100	2.50	Non-coking.
		Coalmont Collieries, Ltd.—									
9348	" 5	No. 3 mine, Bottom bench, counter-level		6.00	26.60	54.20	13.20	0.40	11,470	6.00	Non-coking.
9349	" 5	No. 3 mine, Upper bench, counter-level		5.20	29.70	58.60	6.60	0.30	11,780	1.00	Non-coking.
9350	" 5	No. 4 mine, Upper bench, face of slope		5.30	30.10	57.00	7.60	0.28	11,780	—	Non-coking.
9351	" 5	No. 4 mine, Bottom bench, face of slope		5.60	29.60	57.20	7.60	0.30	11,780	1.00	Non-coking.
9352	" 5	Keystone Coal Co., No. 5 mine		4.70	31.90	54.10	9.30	0.40	11,780	—	Non-coking.
9353	" 5	Sunshine Coal Co., Merritt		2.80	37.50	55.10	4.60	0.40	13,175	—	Good.
		Tulameen Valley Coal Co., Princeton—									
9354	" 5	Lower bench, face of main coal		15.50	30.60	49.20	4.70	0.30	10,540	2.00	Non-coking.
9355	" 5	Top bench, face of Main level		15.90	29.90	49.70	4.50	0.33	10,540	3.00	Non-coking.
		Princeton-B.C. Colliery Co., Ltd.—									
9356	" 5	Lower bench		16.40	28.50	49.70	5.40	0.40	10,540	3.00	Non-coking.
9357	" 5	Top bench		15.20	28.50	47.10	9.20	0.70	10,075	3.00	Non-coking.

	1927.	Corbin Coal & Coke Co., Ltd.—										
9358	Jan. 25	No. 4, run of mine	1.20	18.80	66.10	14.40	0.06	11,880	.....	Poor.		
9359	" 25	No. 6, run of mine	0.80	17.10	67.70	14.40	0.30	12,245	1.00	Good.		
9360A	" 25	Washed coal, 4- by 1-inch	0.60	16.90	67.90	14.60	0.08	12,090	.....	Good.		
9361	" 25	¾-inch slack, unwashed	0.70	19.30	66.50	13.50	0.22	12,245	1.00	Fair.		
9362	" 25	Washed steam	0.30	17.40	68.00	14.30	0.12	12,400	1.00	Good.		
		Corbin Coals, Ltd.—										
9363	" 25	Washed steam, 1½-inch	0.50	20.10	64.40	15.00	0.13	12,090	5.50	Good.		
9364	" 25	Washed furnace, 4- by 1½-inch	0.60	19.00	67.00	13.40	0.12	12,245	2.00	Good.		
9365	Feb.	Tulameen coal, J.D.G.	17.70	30.40	41.90	10.00	0.23	9,470	.....	Non-coking.		
9366	"	Coke from Victoria Gas Works	3.00	3.40	70.20	23.40	0.75	10,307	.....			

TABLE IV.—ANALYSES OF BRITISH COLUMBIA COALS, 1941.

District and Mine.	Sample No.	Date received.	PROXIMATE ANALYSIS.							Remarks.
			Moisture Change after 4 Days' Exposure to Air in Laboratory.	Moisture.	Volatile Combustible Matter.	Fixed Carbon.	Ash.	Sulphur.	B.T.U.'s.	
VANCOUVER ISLAND DISTRICT.										
		1941.								
Comox No. 5 mine (mine-run)	30456	Oct. 3	-0.48	1.1	25.5	55.8	17.6	2.80	12,430	
Comox No. 5 mine (lump)	30457	" 3	-0.29	1.4	25.8	55.6	7.2	1.80	14,140	
Comox No. 5 mine (pea, washed)	30458	" 3	+0.15	1.0	25.9	59.3	13.8	3.60	13,050	
Comox No. 5 mine (slack, washed)	30459	" 3	+0.35	1.1	28.6	56.6	13.7	2.80	12,960	
Comox No. 5 mine (nut, washed)	30460	" 3	+0.48	1.1	27.9	61.3	9.7	2.30	13,800	
Comox No. 8 mine (mine-run)	30485	" 3	-1.33	0.9	23.1	58.4	17.8	2.90	12,290	
Comox No. 8 mine (lump)	30483	" 3	-0.28	1.2	24.3	67.7	6.8	1.30	14,110	
Comox No. 8 mine (pea)	30484	" 3	+0.54	1.0	24.5	60.4	14.1	2.96	12,870	
Comox No. 8 mine (slack)	30487	" 3	+0.07	0.9	24.5	68.2	16.4	2.35	12,340	
Comox No. 8 mine (nut)	30486	" 3	+0.36	0.9	23.8	65.1	10.2	2.14	13,600	
Northfield mine (mine-run)	1217	" 7	-0.67	0.8	34.3	51.9	13.0	0.74	12,120	
Northfield mine (lump)	1216	" 7	-0.33	1.3	35.7	57.9	5.1	0.77	13,650	
Northfield mine (pea, washed)	1215	" 7	-0.83	1.1	33.7	55.7	9.5	0.77	12,870	
Northfield mine (slack, washed)	1213	" 7	-10.60	1.7	32.7	63.1	12.6	0.95	12,270	
Northfield mine (nut, washed)	1214	" 7	-0.51	1.5	32.1	59.1	7.3	0.77	13,230	
South Wellington No. 10 mine (mine-run)	1203	" 7	-0.48	1.0	25.3	54.4	19.3	0.45	11,840	Douglas Seam.
South Wellington No. 10 mine (lump)	1206	" 7	-0.17	1.0	32.2	58.1	8.6	0.41	13,510	Douglas Seam.
South Wellington No. 10 mine (pea, washed)	1205	" 7	-2.12	1.2	33.6	52.5	12.7	0.53	12,470	Douglas Seam.
South Wellington No. 10 mine (slack, washed)	1207	" 7	-5.32	1.86	28.9	64.3	15.0	0.58	12,290	Douglas Seam.
South Wellington No. 10 mine (nut, washed)	1204	" 7	-0.21	1.2	28.8	60.2	9.8	0.50	12,220	Douglas Seam.
Beban mine (Extension) (mine-run)	1212	" 7	-0.81	0.6	31.9	52.3	15.2	0.51	12,040	Wellington Seam.
Beban mine (Extension) (lump)	1211	" 7	-0.18	1.1	32.2	58.4	9.3	0.64	13,410	Wellington Seam.
Beban mine (Extension) (pea, washed)	1210	" 7	-3.81	1.8	33.2	55.0	10.0	0.60	13,270	Wellington Seam.
Beban mine (Extension) (slack, washed)	1208	" 7	-6.56	0.8	32.2	53.7	13.3	0.64	12,510	Wellington Seam.
Beban mine (Extension) (nut, washed)	1209	" 7	-0.53	2.1	31.1	59.2	7.6	0.51	13,370	Wellington Seam.
Lantzville No. 1 mine (mine-run)	1201	" 4	-1.49	2.7	31.3	52.3	13.7	0.67	11,310	Wellington Seam.
Lantzville No. 1 mine (lump)	30499	" 4	-0.66	3.1	37.4	53.5	6.0	0.66	12,620	Wellington Seam.
Lantzville No. 1 mine (pea, washed)	30498	" 4	-2.20	2.9	37.1	50.0	10.0	0.68	12,200	Wellington Seam.
Lantzville No. 1 mine (slack, washed)	30500	" 4	-7.40	3.0	31.4	48.5	17.1	0.68	10,910	Wellington Seam.
Lantzville No. 1 mine (nut, washed)	1202	" 4	-2.60	2.6	32.1	54.8	10.5	0.64	12,050	Wellington Seam.
NICOLA-PRINCETON DISTRICT.										
Middlesboro Colliery—										
No. 2 South mine (mine-run)	30488	" 3	-0.26	3.8	31.2	56.7	8.3	0.65	12,400	No. 2 Seam.

No. 2 South mine (lump)	30492	Oct. 8	-0.12	5.0	31.7	52.9	10.4	0.52	11,780	No. 2 Seam.
No. 2 South mine (pea)	30491	" 3	-0.82	4.6	32.4	55.1	7.9	0.55	12,280	No. 2 Seam.
No. 2 South mine (slack)	30489	" 3	-0.18	4.3	32.7	53.9	9.1	0.56	11,940	No. 2 Seam.
No. 2 South mine (nut)	30490	" 3	-0.43	4.6	31.5	55.5	8.4	0.60	12,130	No. 2 Seam.
No. 3 North mine (mine-run)	30493	" 3	-0.38	5.0	23.0	51.4	20.6	0.93	10,190	No. 3 Seam.
No. 3 North mine (lump)	30497	" 3	-0.29	4.8	30.1	55.0	10.1	0.78	12,280	No. 3 Seam.
No. 3 North mine (pea)	30495	" 3	-0.42	4.5	27.0	52.2	16.3	1.34	10,940	No. 3 Seam.
No. 3 North mine (slack)	30496	" 3	-0.60	4.8	25.5	53.1	16.6	1.57	10,780	No. 3 Seam.
No. 3 North mine (nut)	30494	" 3	-0.39	4.8	28.4	52.3	14.5	0.88	11,400	No. 3 Seam.
Princeton Tulameen No. 1 mine (mine-run)	30461	" 3	-3.54	14.9	29.5	47.6	8.0	0.29	9,810	
Princeton Tulameen No. 1 mine (lump)	30462	" 3	-1.60	16.2	30.0	48.8	5.0	0.41	9,780	
Princeton Tulameen No. 1 mine (pea)	30463	" 3	-4.22	11.4	26.5	39.3	22.8	0.31	7,780	
Princeton Tulameen No. 1 mine (slack)	30464	" 3	-4.38	11.7	25.2	41.7	21.4	0.30	7,860	
Princeton Tulameen No. 1 mine (nut)	30465	" 3	-3.75	12.1	31.3	47.7	8.9	0.40	10,360	
Granby No. 1 mine (mine-run)	30467	" 3	-3.10	13.9	28.3	44.1	13.7	0.63	8,660	No. 1 Seam.
Granby No. 1 mine (lump)	30466	" 3	-1.70	17.6	27.0	49.4	6.0	0.51	9,424	No. 1 Seam.
Granby No. 1 mine (pea)	30468	" 3	-4.60	17.3	28.8	37.4	16.5	0.60	7,400	No. 1 Seam.
Granby No. 1 mine (slack)	30470	" 3	-5.30	14.2	27.8	40.1	17.3	0.44	7,520	No. 1 Seam.
Granby No. 1 mine (nut)	30469	" 3	-2.70	15.0	31.9	42.2	10.9	0.64	5,960	No. 1 Seam.
EAST KOOTENAY DISTRICT.										
Crow's Nest Pass Coal Co.—										
Coal Creek No. 1 East mine (mine-run)	30471	" 3	-0.02	0.6	17.8	71.5	10.1	0.58	13,610	No. 1 Seam.
Coal Creek No. 1 East mine (screened coal)	30472	" 3	-0.04	0.6	20.8	69.6	9.0	0.44	13,720	No. 1 Seam.
Coal Creek No. 1 East mine (slack)	30473	" 3	-0.07	0.7	18.4	70.6	10.3	0.40	13,615	No. 1 Seam.
Michel Colliery (mine-run)	30474	" 3	-0.28	0.7	17.1	63.0	19.3	0.54	12,300	No. 1 Seam.
Michel Colliery (cleaned coal)	30478	" 3	-0.10	0.9	15.2	73.2	7.7	0.44	14,080	No. 1 Seam.
Michel Colliery (mine-run)	30475	" 3	-0.15	0.6	17.0	63.4	14.0	0.80	12,590	No. 9 Seam.
Michel Colliery (cleaned coal)	30479	" 3	-0.10	0.8	17.6	73.8	7.8	0.76	13,779	No. 9 Seam.
Michel Colliery (mine-run)	30476	" 3	-0.03	0.8	19.1	66.7	13.4	0.56	13,000	" A " Seam.
Michel Colliery (cleaned coal)	30480	" 3	+0.01	0.9	18.5	72.5	8.1	0.85	14,220	" A " Seam.
Michel Colliery (mine-run)	30477	" 3	-0.02	0.9	18.9	70.8	9.4	0.76	13,640	" B " Seam.
Michel Colliery (cleaned coal)	30481	" 3	+0.01	0.9	18.3	76.7	4.1	0.78	14,840	" B " Seam.
Michel Colliery (slack to coke-ovens)	30482	" 3	-0.15	0.9	18.9	72.7	7.5	0.78	14,240	
PEACE RIVER DISTRICT.										
1940.										
King Gething mine, Hudson Hope	1	Dec. 12	-----	1.7	17.4	70.0	10.9	0.77	13,237	
Packwood mine	2	" 12	-----	1.1	15.4	80.2	3.3	0.60	14,156	

COMPARATIVE PULVERIZED FUEL BOILER TESTS ON BRITISH COLUMBIA COALS, 1929 TO 1930.

During 1929-30 an investigation was carried out at Ottawa by the staff of the Division of Fuels, Bureau of Mines, Department of Mines and Resources, to obtain data regarding the burning of Canadian fuels in the pulverized state for steam-raising. It was considered that this information would be of particular benefit to operators of coal-fired boiler plants in Western and Central Canada.

Twelve British Columbia coals were selected and shipped under the direction of the Inspectors of Mines.

Colliery operators supplied the coal gratuitously and Canadian National and Canadian Pacific Railway Companies transported ten car-loads free of charge to Ottawa.

Table V. shows the more salient results of the tests on British Columbia coals. The first four items of the table refer to the fuel as it is delivered to the pulverizer and give an indication of its inherent qualities. The next two items show: first, the fineness to which the coal was ground in the pulverizer; and, secondly, the power required to attain that degree of fineness. These two items together may be taken as a measure of the so-called "grindability" of the fuel. The next two items following set forth the economic possibilities of the fuel when burned in this manner: the first of the two—namely, water evaporated per pound of fuel fired—is, perhaps, of more interest to the operating engineers, and the second—namely, fuel fired per 1,000 pounds of steam generated—to the power-plant owner. The last two items in the table deal solely with the performance of the boiler and the rated boiler capacity developed.

Full reports of the tests have been prepared, consisting of eighty-four items of information regarding each test of each coal. The complete report can be obtained from the Department of Mines and Resources, Ottawa, in the Bulletin: "Comparative Pulverised Fuel Boiler Tests on British Columbia and Alberta Coals and on Ontario Lignite," by C. E. Baltzer and E. S. Malloch.

TABLE V.

Fuel Number.	Item Number.	7A.	7B.	9A.	13B.	20F.	24G.	54D.	18D.	73.	82.
	Name of Item.	Moisture in Fuel as fired.	Ash in Fuel as fired.	Calorific Value of Fuel as fired, B.T.U. (Gross).	Fusion Temperature of Ash.	Pulverized Fuel passed through 200-mesh.	K.W.H. required to pulverize 1 Ton Fuel.	Water evaporated per Pound of Fuel fired.	Fuel fired per 1,000 Lb. of Steam generated.	Per Cent. of Rated Boiler Capacity developed.	Thermal Efficiency of Boiler.
		%	%		Deg. F.	%		Lb.	Lb.		%
5-29	Pleasant Valley.....	28.9	13.3	8,110	2093	41.9	32.7	5.84	187.3	137	63.9
4-29	Tulameen.....	19.7	9.5	9,360	2118	40.4	33.4	6.29	159.0	160	65.2
8-30	Coalmont.....	7.9	10.3	11,450	2239	53.0	33.3	7.60	131.6	194	64.4
6-29	Middlesboro.....	9.3	11.3	11,230	2588	54.3	32.3	7.48	153.7	191	64.6
10-30	Wellington.....	5.3	17.2	11,330	2145	67.9	34.2	7.51	183.2	192	64.3
9-30	Reserve.....	8.9	13.5	12,140	2223	61.6	31.7	7.96	125.6	204	63.6
19-30	Comox.....	3.9	14.6	12,250	2459	65.0	30.8	8.05	124.1	206	63.8
17-30	Cassidy.....	3.0	11.6	12,630	2307	67.1	31.5	8.21	121.8	209	63.1
13-30	Telkwa.....	3.2	12.8	12,820	2179	66.1	32.4	8.49	117.8	216	64.3
20-30	Michel.....	1.7	7.7	13,950	2032	78.6	31.6	9.46	105.7	222	65.8
3-31	Corbin Birdseye.....	4.9	16.9	11,680	2700	78.7	48.7	7.99	125.2	201	66.4
2-31	Corbin Washed Steam.....	3.9	12.7	12,540	2490	80.9	46.1	8.54	117.1	219	66.1
7-30	Operating Coal.....	1.8	8.3	13,700	2593	69.5	30.9	8.69	115.1	223	61.6

LOW-TEMPERATURE CARBONIZATION OF COAL.

During 1928 in order to obtain information regarding the low-temperature carbonization possibilities of Vancouver Island coals, the Inspection Branch took samples of different coals in the Nanaimo and Ladysmith Districts and forwarded them to "Low Temperature Carbonization, Limited," Barnsley, England, for testing in their low-temperature carbonization plant.

Samples of 100 lb. each of the following coals and the results obtained are shown in Table VI.

TABLE VI.

No. 5 MINE, SOUTH WELLINGTON, CANADIAN COLLIERIES (D.), LTD. (LUMP COAL.)

ANALYSIS OF COAL.			YIELD OF PRODUCTS.
	As Charged.	Dry State.	
	Per Cent.	Per Cent.	
F.C.....	52.87	53.74	Coal-oils (dry): 25.92 gals. per ton.
V.C.M.....	37.87	38.50	Liquor: 14.79 gals. per ton.
Ash.....	6.69	6.89	Gas: 4,409 cu. ft. per ton.
Sulphur.....	0.94	0.96	Coalite: 13.92 cwt. per ton=69.60 per cent. yield.
Moisture.....	1.63	-----	Coalite: Easy discharge. Good quality but would break up into rather small pieces. Contains 9.20 per cent. V.M.
Coal charged to retort, 10 lb. (crushed to ½ inch and under).			Coal-oil: Specific gravity at 60° F.=1.0355.
			Gas: 769.08 B.T.U.'s per cu. ft. (calculated).

No. 5 MINE, SOUTH WELLINGTON, CANADIAN COLLIERIES (D.), LTD.

(No. 1 WASHED PEA COAL.)

F.C.....	50.76	51.50	Coal-oil (dry): 20.31 gals. per ton.
V.C.M.....	34.68	35.20	Liquor: 14.69 gals. per ton.
Ash.....	12.40	12.59	Gas: 4,055 cu. ft. per ton.
Sulphur.....	0.70	0.71	Coalite: 14.78 cwt. per ton=73.99 per cent. yield.
Moisture.....	1.45	-----	Coalite: Extremely easy discharge in one piece. Good quality. Contains 9.50 per cent. V.M.
Coal charged to retort, 10 lb.			Coal-oil: Specific gravity at 60° F.=1.036.
			Gas: 808.26 B.T.U.'s per cu. ft. (calculated).

EXTENSION MINES, CANADIAN COLLIERIES (D.), LTD. (WASHERY FINES.)

F.C.....	45.29	47.01	Coal-oil (dry): 18.33 gals. per ton.
V.C.M.....	33.12	33.70	Liquor: 14.30 gals. per ton.
Ash.....	18.38	18.70	Gas: 3,897 cu. ft. per ton.
Sulphur.....	0.58	0.59	Coalite: 15.12 cwt. per ton=75.60 per cent. yield.
Moisture.....	1.72	-----	Coalite: Extremely easy discharge in one piece. Good quality. Very strong structure. Contains 9.90 per cent. V.M.
Coal charged to retort, 10 lb.			Coal-oil: Specific gravity at 60° F.=1.031.
			Gas: 824.58 B.T.U.'s per cu. ft. (calculated).

EXTENSION MINES, CANADIAN COLLIERIES (D.), LTD. (WASHED NUT.)

F.C.....	52.29	52.95	Coal-oil (dry): 24.46 gals. per ton.
V.C.M.....	33.36	33.80	Liquor: 13.57 gals. per ton.
Ash.....	12.63	12.70	Gas: 4,045 cu. ft. per ton.
Sulphur.....	0.64	0.65	Coalite: 14.62 cwt. per ton=73.10 per cent. yield.
Moisture.....	1.23	-----	Coalite: Extremely easy discharge in one piece. Good quality. Lumpy outside appearance. Contains 7.50 per cent. V.M.
Coal charged to retort, 10 lb.			Coal-oil: Specific gravity at 60° F.=1.012 (would be difficult to separate by decantation).
			Gas: 840.25 B.T.U.'s per cu. ft. (calculated).

WAKESIAH MINE, WESTERN FUEL CORPORATION OF CANADA, LTD. (LUMP COAL.)

ANALYSIS OF COAL.			YIELD OF PRODUCTS.
	As Charged.	Dry State.	
	Per Cent.	Per Cent.	
F.C.....	47.27	48.26	Coal-oil (dry) : 20.60 gals. per ton.
V.C.M.....	38.67	39.60	Liquor: 16.81 gals. per ton.
Ash.....	10.38	10.60	Gas: 4,547 cu. ft. per ton.
Sulphur.....	1.69	1.64	Coalite: 14.24 cwt. per ton=71.20 per cent. yield.
Moisture.....	2.03	.....	Coalite: Extremely easy discharge. Rather poor quality. Friable as the coal is not a good caking coal. Contains 10 per cent. V.M.
Coal charged to retort, 10 lb. (crushed to ¼ inch and under).			Coal-oil: Specific gravity at 60° F.=1.043.
			Gas: 803.71 B.T.U.'s per cu. ft. (calculated).

No. 1 MINE (DOUGLAS SEAM), WESTERN FUEL CORPORATION OF CANADA, LTD. (LUMP COAL.)

F.C.....	46.30	47.07	Coal-oil (dry) : 22.04 gals. per ton.
V.C.M.....	40.52	41.20	Liquor: 17.50 gals. per ton.
Ash.....	11.20	11.30	Gas: 4,771 cu. ft. per ton.
Sulphur.....	0.33	0.34	Coalite: 14.06 cwt. per ton=70.30 per cent. yield.
Moisture.....	1.65	.....	Coalite: Easy discharge as breeze for the most part. Coal is practically non-caking. Contains 9.80 per cent. V.M.
Coal charged to retort, 10 lb. (crushed to ¼ inch and under).			Coal-oil: Specific gravity at 60° F.=1.033.
			Gas: 807.71 B.T.U.'s per cu. ft. (calculated).

RESERVE MINE, WESTERN FUEL CORPORATION OF CANADA, LTD. (WASHED SLACK.)

F.C.....	44.22	45.24	Coal-oil (dry) : 19.18 gals. per ton.
V.C.M.....	36.70	37.50	Liquor: 17.36 gals. per ton.
Ash.....	15.86	16.00	Gas: 4,054 cu. ft. per ton.
Sulphur.....	1.24	1.26	Coalite: 14.42 cwt. per ton=72.10 per cent. yield.
Moisture.....	1.80	.....	Coalite: Easy discharge. Rather poor quality. Coal not strongly caking. Large amount of breeze. Contains 10.50 per cent. V.M.
Coal charged to retort, 10 lb.			Coal-oil: Specific gravity at 60° F.=1.047.
			Gas: 777.88 B.T.U.'s per cu. ft. (calculated).

TESTS ON THE LIQUIFACTION OF BRITISH COLUMBIA COALS BY HYDROGENATION.

During the past twenty-five years the world's consumption of petroleum has greatly increased. In 1937 production (two billion barrels) was twice that of 1920. Since 1939, due to the world war, petroleum production has increased considerably.

In Great Britain and Germany the production of oil from coal has assumed a place of importance. During 1938 tests were carried out at Ottawa by the Department of Mines and Resources to ascertain the suitability of various Canadian coals for the production of oil by the hydrogenation process. Samples were sent to Ottawa from the Michel Colliery of the Crow's Nest Pass Coal Company, Ltd.; from No. 5 mine, Comox, of Canadian Collieries, Ltd., Vancouver Island; and from Middlesboro Collieries, Nicola District. A complete description of the tests made on these coals is given in a bulletin by T. E. Warren and K. W. Bowles, entitled "Tests on Liquifaction of Canadian Coals by Hydrogenation," published by the Department of Mines and Resources at Ottawa.

Table VII. gives the yields of primary oils from various Canadian coals and from the Durham coal in England. It will be noticed that two of the Canadian coals—one from Sydney, Nova Scotia, and one from Middlesboro, Nicola District, British Columbia—gave higher yields of oil than the standard English coal.

TABLE VII.—YIELDS OF PRIMARY OIL.

DESIGNATION OF COAL.			Imperial Gallons per 2,000 Lb., Dry and Ash-free Basis.
No.	Location.	Rank.	
1	Crowanest, B.C.	Medium-volatile bituminous	124
2	Vancouver Island, B.C.	High-volatile Bituminous A	134
3	Durham, Eng.*	" " A	143
4	Sydney, N.S.	" " A	154
5	Nicola, B.C.	" " B	148
6	Saunders, Alta.	" " C	107
7	Drumheller, Alta.	Sub bituminous B	125
8	Edmonton, Alta.	" " C	115
9	Bienfait, Sask.	Lignite	113
10	Onakawana, Ont.	Lignite	111
11	Alfred, Ont.	Peat	88

* Standard of comparison.

TABLE VIII.—SELECTED ADDITIONAL COAL ANALYSES.

Location.	PROXIMATE ANALYSIS.				Sulphur.	B.T.U.'s.	Coking Properties.
	Moisture.	Volatile Matter.	Fixed Carbon.	Ash.			
VANCOUVER ISLAND DISTRICT.							
Tsable River,* No. 3 Prospect, middle bench.....	1.3	31.6	59.1	9.0	0.8	13,500	Good.
Tsable River,* No. 3 Prospect, lower bench.....	1.5	30.6	54.8	13.1	1.1	12,920	Good.
Tsable River,* No. 4 Prospect, top bench.....	2.7	30.4	54.9	12.0	2.0	12,310	Agglomerate.
Quinsam River,† outcrop sample.....	2.4	37.7	47.4	12.5	3.7	11,940	Very poor.
Quinsam River,‡ outcrop sample.....	2.7	38.5	45.9	12.9	2.8	11,860	Very poor.
NORTHERN DISTRICT.							
Bowron River, selected sample.....	6.1	33.9	55.3	4.7	0.6	12,160	
Bowron River,‡ top 7 feet of 8-foot seam.....	5.9	34.0	46.7	14.3	1.6	10,989	

* Bureau of Mines, Ottawa, Publ. No. 776, p. 114.

† Bureau of Mines, Ottawa, Publ. No. 779, p. 116.

‡ Minister of Mines, B.C., Ann. Rept., 1946, p. 248.

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